FIG. 1

2 MULTI-CHANNEL AMPLIFIER

20 DECODER

21 MULTIPLEXER

22 SOUND FIELD PROCESSING PORTION

23 CHANGEOVER SWITCH

24 POWER AMPLIFIER

25 MEASURING SIGNAL GENERATING PORTION

26 REFERENCE SIGNAL TRANSMITTING PORTION

27 RECEPTION PORTION

28 POSITION CALCULATING PORTION

29 POSITION TABLE

30 SPEAKER LAYOUT CORRECTION PORTION

31 SOUND FIELD CONTROL PORTION

FIG. 2

1 SENSOR

10 RECEPTION PORTION

11 MICROPHONE

12 TIME DIFFERENCE MEASURING PORTION

13 TRANSMISSION PORTION

FIG. 3

101 GENERATE MEASURING SIGNAL

102 TRANSMIT REFERENCE SIGNAL

103 RECEIVE REFERENCE SIGNAL AND MEASURING SOUND WAVE

104 MEASURE TIME DIFFERENCE

105 CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR

106 IS DISTANCE CALCULATION TERMINATED?

107 CALCULATE SENSOR POSITION

108 GENERATE MEASURING SIGNAL

109 TRANSMIT REFERENCE SIGNAL

110 RECEIVE REFERENCE SIGNAL AND MEASURING SOUND WAVE

111 MEASURE TIME DIFFERENCE

112 CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR

113 CALCULATE SPEAKER POSITION

114 IS POSITION CALCULATION TERMINATED?

115 IS LAYOUT INCORRECT?

116 CHANGE OVER LINES

117 CORRECT SOUND FIELD

FIG. 4

2 MULTI-CHANNEL AMPLIFIER

FIG. 5

201 GENERATE MEASURING SIGNAL

202 TRANSMIT REFERENCE SIGNAL

203 RECEIVE REFERENCE SIGNAL AND MEASURING SOUND WAVE

204 MEASURE TIME DIFFERENCE

205 CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR

206 IS DISTANCE CALCULATION TERMINATED?

207 CALCULATE SENSOR POSITION

208 CALCULATE EACH SPEAKER POSITION IN ACCORDANCE WITH CHANGE OF LISTENING POSITION

209 CORRECT SOUND FIELD

FIG. 6

2 MULTI-CHANNEL AMPLIFIER

FIG. 7

2a MULTI-CHANNEL AMPLIFIER

20 DECODER

21 MULTIPLEXER

22 SOUND FIELD PROCESSING PORTION

23 CHANGEOVER SWITCH

24 POWER AMPLIFIER

25 MEASURING SIGNAL GENERATING PORTION

27 RECEPTION PORTION

28 POSITION CALCULATING PORTION

29 POSITION TABLE

30 SPEAKER LAYOUT CORRECTION PORTION

31 SOUND FIELD CONTROL PORTION

32 TIME DIFFERENCE MEASURING PORTION

FIG. 8

1a SENSOR

11 MICROPHONE

13a TRANSMISSION PORTION

FIG. 9

301 GENERATE MEASURING SIGNAL

302 RECEIVE MEASURING SOUND WAVE

303 MEASURE TIME DIFFERENCE

304 CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR

305 IS DISTANCE CALCULATION TERMINATED?

306 CALCULATE SENSOR POSITION

307 GENERATE MEASURING SIGNAL

308 RECEIVE MEASURING SOUND WAVE

309 MEASURE TIME DIFFERENCE

310 CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR

311 CALCULATE SPEAKER POSITION

312 IS POSITION CALCULATION TERMINATED?

313 IS LAYOUT INCORRECT?

314 CHANGE OVER LINES

315 CORRECT SOUND FIELD

FIG. 10

2a MULTI-CHANNEL AMPLIFIER

FIG. 11

401 GENERATE MEASURING SIGNAL

402 RECEIVE MEASURING SOUND WAVE

403 MEASURE TIME DIFFERENCE

404 CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR

405 IS DISTANCE CALCULATION TERMINATED?

406 CALCULATE SENSOR POSITION

407 IS POSITION CALCULATION TERMINATED?

408 IS LAYOUT INCORRECT?

409 CHANGE OVER LINES

410 CORRECT SOUND FIELD

FIG. 1

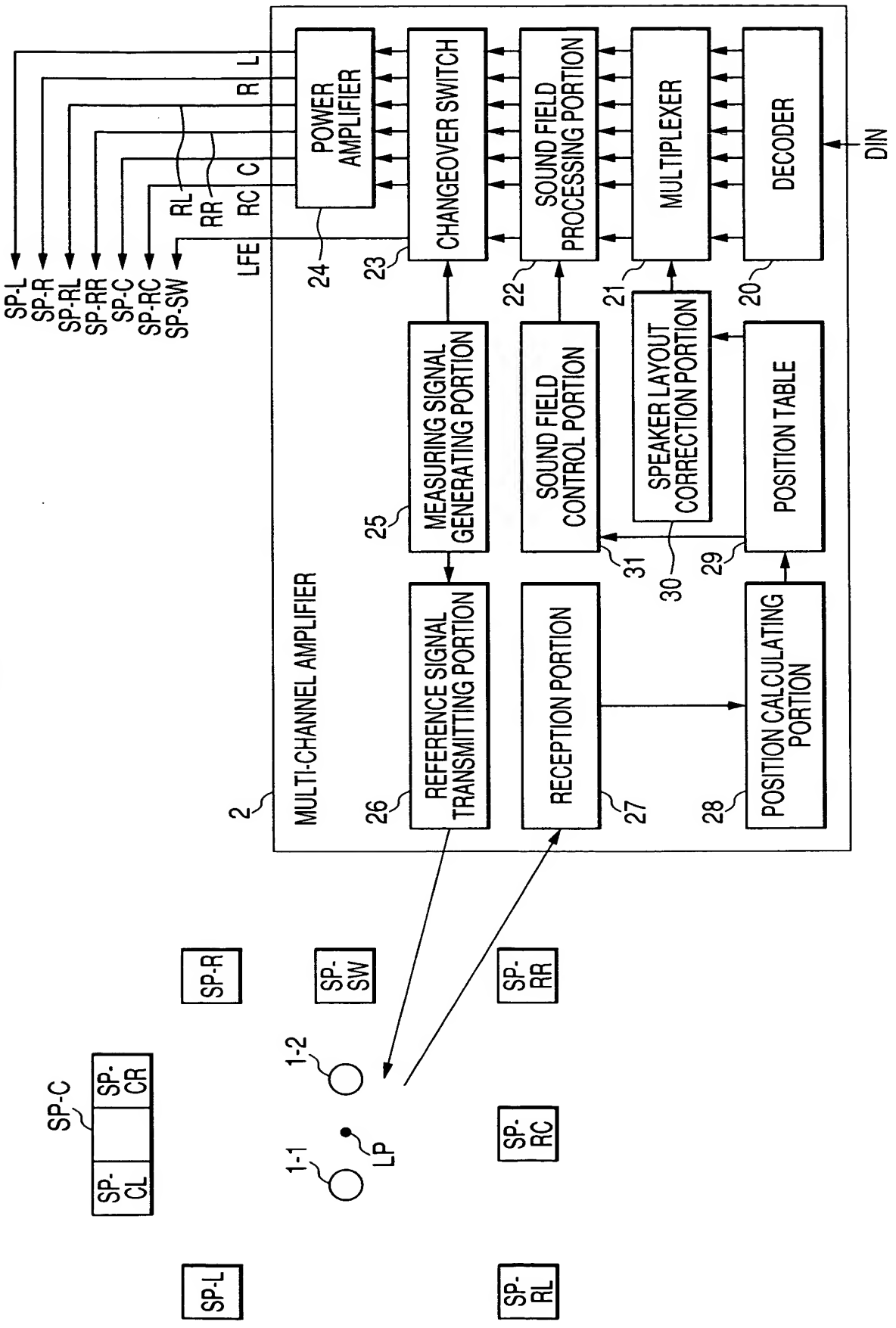

MULTI-CHANNEL AMPLIFIER
2
POWER AMPLIFIER
24
CHANGEOVER SWITCH
23
SOUND FIELD PROCESSING PORTION
22
MULTIPLEXER
21
DECODER
20
DIN
L
R
C
RC
RR
RL
LFE
SP-L
SP-R
SP-RL
SP-RR
SP-C
SP-RC
SP-SW
MEASURING SIGNAL GENERATING PORTION
25
SOUND FIELD CONTROL PORTION
31
SPEAKER LAYOUT CORRECTION PORTION
30
POSITION TABLE
29
REFERENCE SIGNAL TRANSMITTING PORTION
26
RECEPTION PORTION
27
POSITION CALCULATING PORTION
28
SP-R
SP-SW
SP-RR
SP-C
SP-CR
SP-CL
1-2
1-1
LP
SP-RC
SP-L
SP-RL

FIG. 2

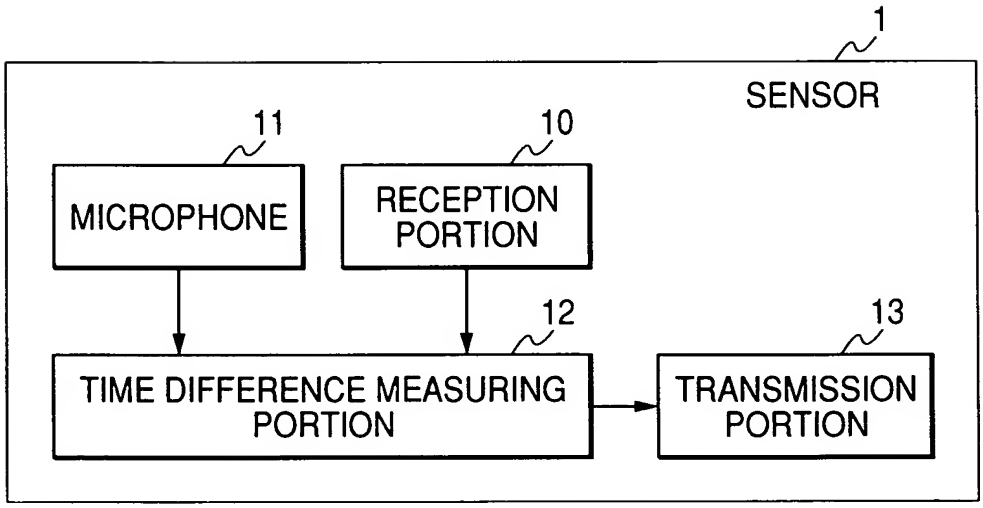

1
SENSOR
11
MICROPHONE
10
RECEPTION PORTION
12
TIME DIFFERENCE MEASURING PORTION
13
TRANSMISSION PORTION

FIG. 3

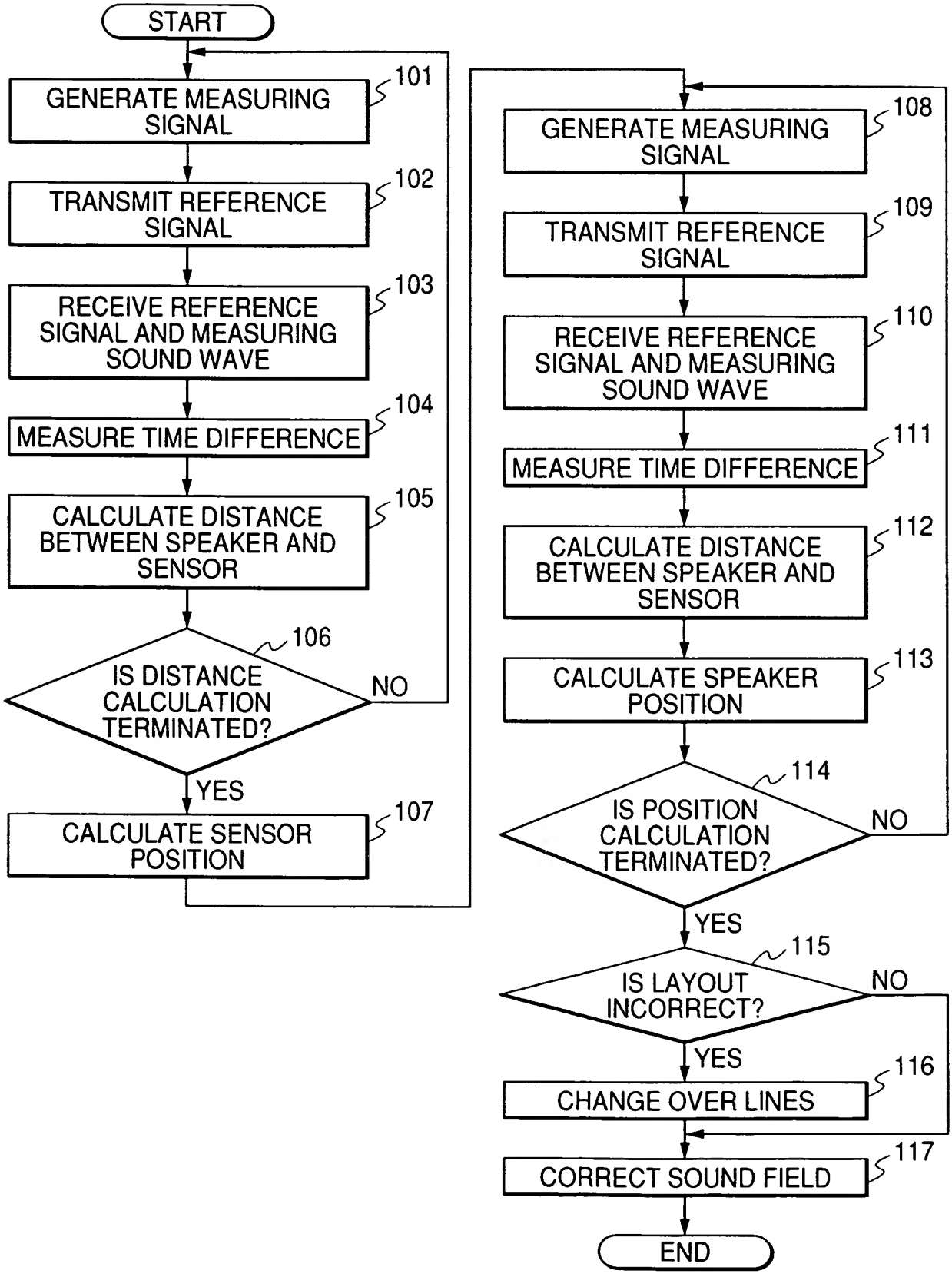

START
GENERATE MEASURING SIGNAL
101
TRANSMIT REFERENCE SIGNAL
102
RECEIVE REFERENCE SIGNAL AND MEASURING SOUND WAVE
103
MEASURE TIME DIFFERENCE
104
CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR
105
IS DISTANCE CALCULATION TERMINATED?
106
NO
YES
CALCULATE SENSOR POSITION
107
GENERATE MEASURING SIGNAL
108
TRANSMIT REFERENCE SIGNAL
109
RECEIVE REFERENCE SIGNAL AND MEASURING SOUND WAVE
110
MEASURE TIME DIFFERENCE
111
CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR
112
CALCULATE SPEAKER POSITION
113
IS POSITION CALCULATION TERMINATED?
114
NO
YES
IS LAYOUT INCORRECT?
115
NO
YES
CHANGE OVER LINES
116
CORRECT SOUND FIELD
117
END

FIG. 4

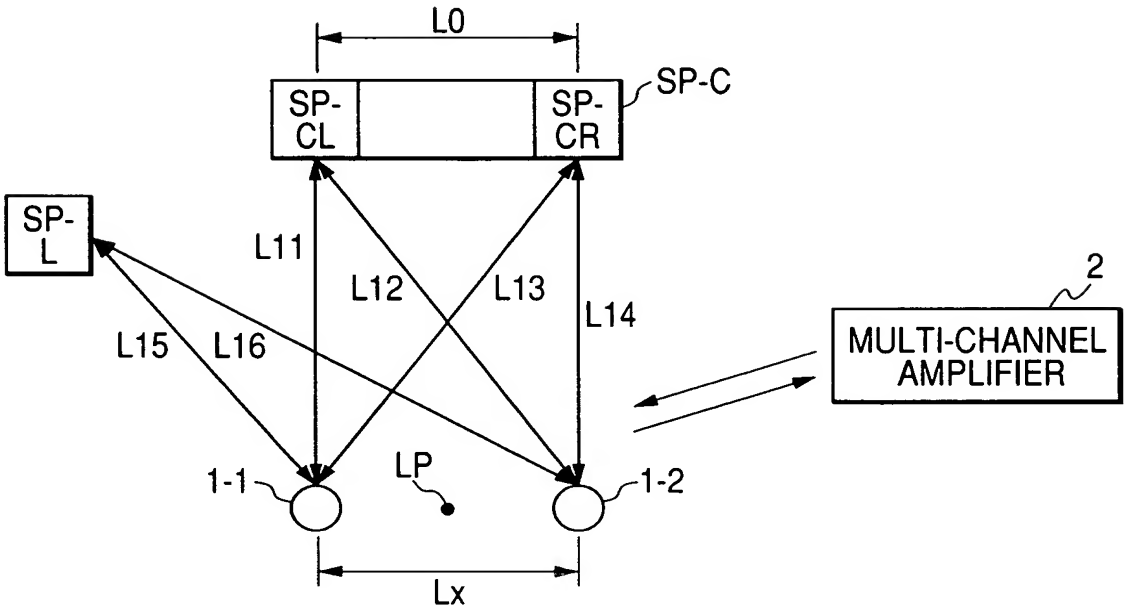

L0
SP-CL
SP-CR
SP-C
SP-L
L11
L12
L13
L14
L15
L16
2
MULTI-CHANNEL AMPLIFIER
1-1
LP
1-2
Lx

FIG. 5

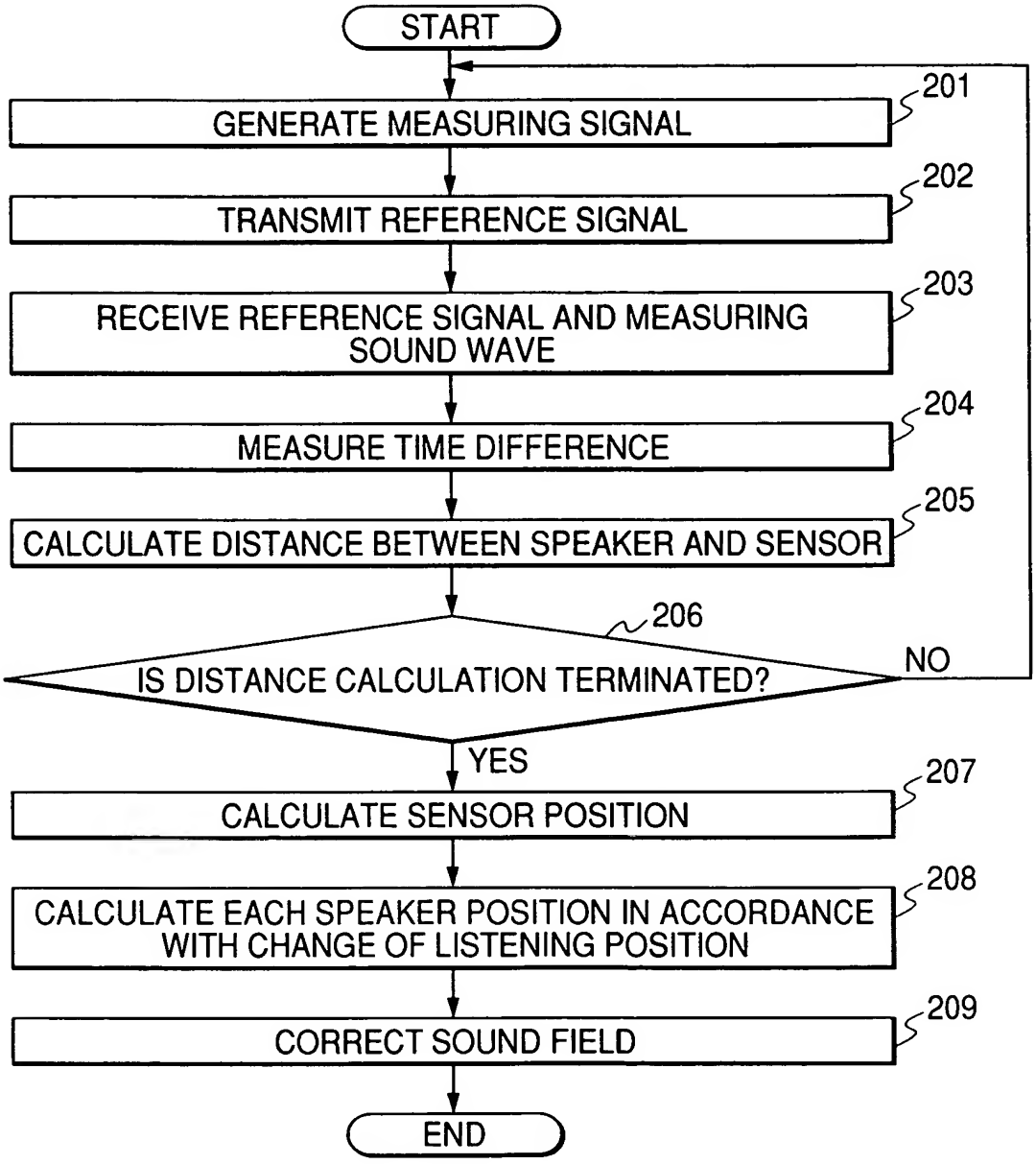

START
GENERATE MEASURING SIGNAL
201
TRANSMIT REFERENCE SIGNAL
202
RECEIVE REFERENCE SIGNAL AND MEASURING SOUND WAVE
203
MEASURE TIME DIFFERENCE
204
CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR
205
206
IS DISTANCE CALCULATION TERMINATED?
NO
YES
CALCULATE SENSOR POSITION
207
CALCULATE EACH SPEAKER POSITION IN ACCORDANCE WITH CHANGE OF LISTENING POSITION
208
CORRECT SOUND FIELD
209
END

FIG. 6

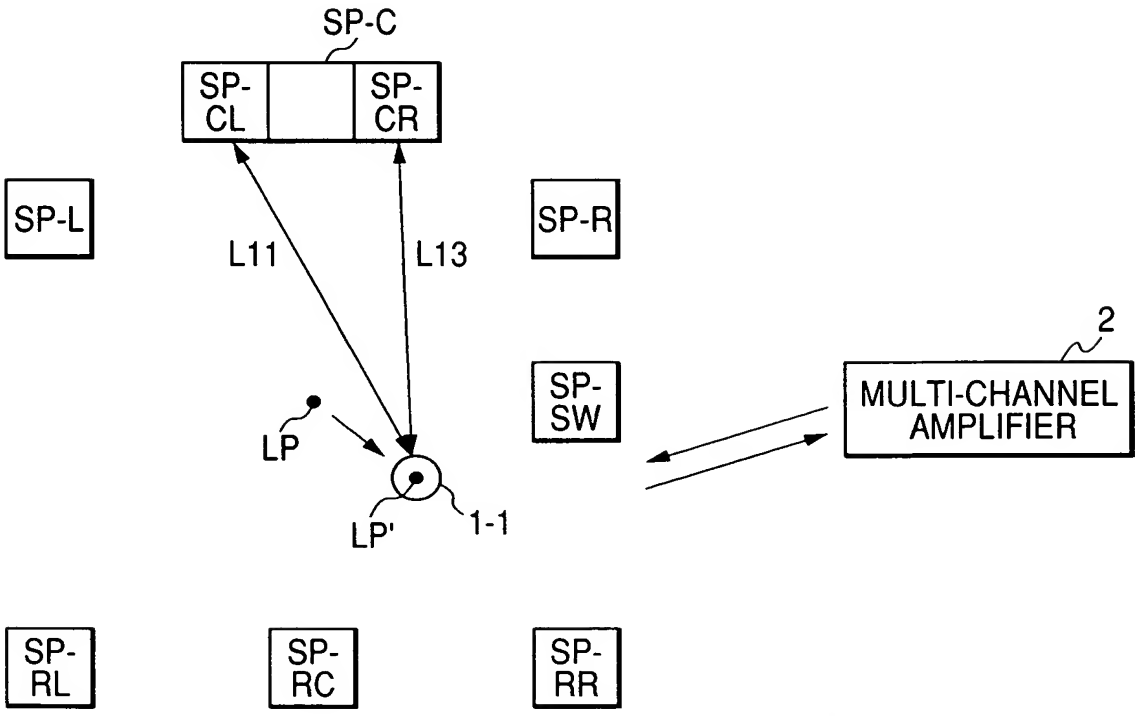

SP-C
SP-CL
SP-CR
SP-L
SP-R
L11
L13
2
SP-SW
MULTI-CHANNEL AMPLIFIER
LP
LP'
1-1
SP-RL
SP-RC
SP-RR

FIG. 7

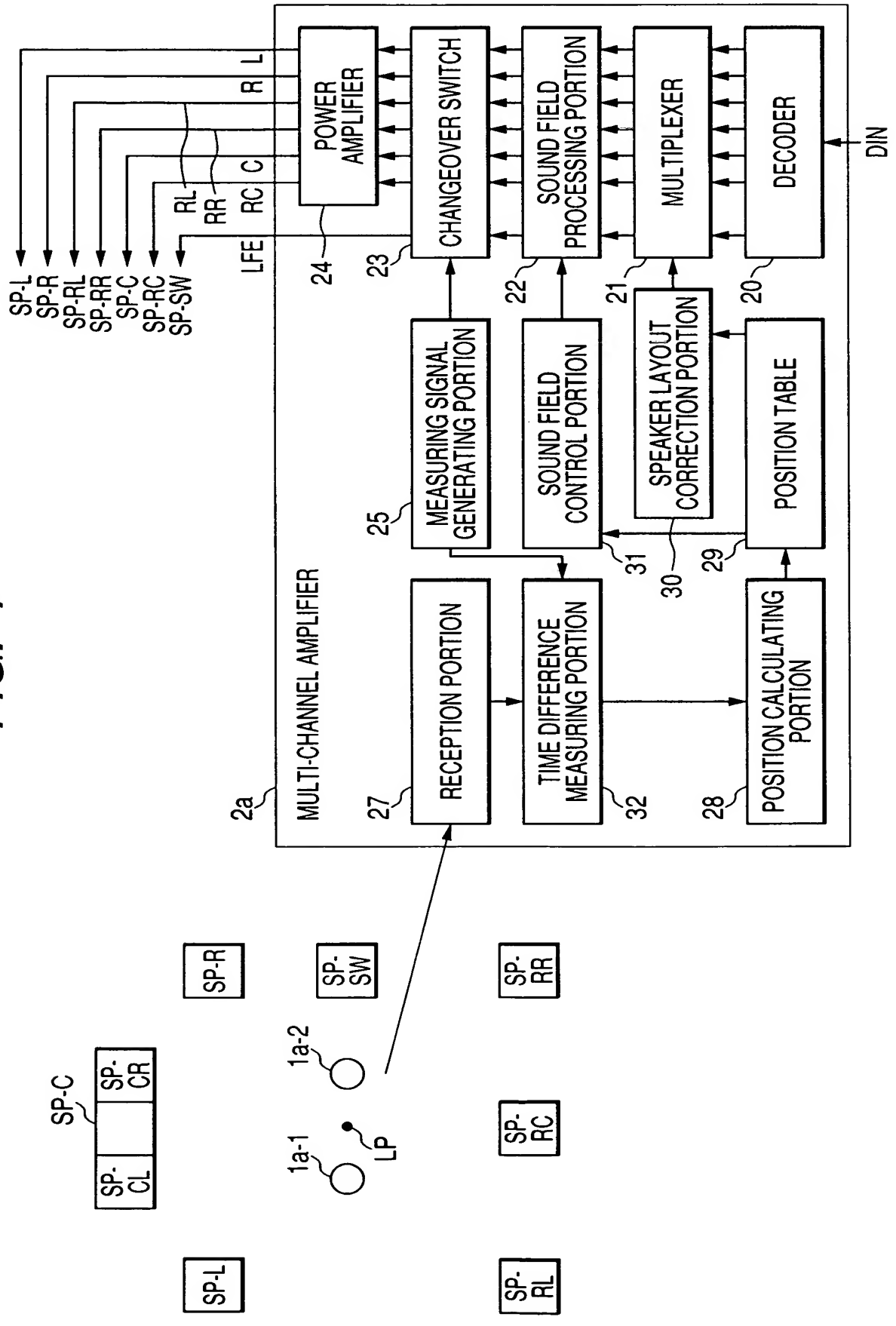

MULTI-CHANNEL AMPLIFIER
2a
POWER AMPLIFIER
24
CHANGEOVER SWITCH
23
SOUND FIELD PROCESSING PORTION
22
MULTIPLEXER
21
DECODER
20
DIN
L
R
C
RL
RR
RC
LFE
SP-L
SP-R
SP-RL
SP-RR
SP-C
SP-RC
SP-SW
MEASURING SIGNAL GENERATING PORTION
25
SOUND FIELD CONTROL PORTION
31
SPEAKER LAYOUT CORRECTION PORTION
30
POSITION TABLE
29
RECEPTION PORTION
27
TIME DIFFERENCE MEASURING PORTION
32
POSITION CALCULATING PORTION
28
SP-CL
SP-CR
1a-1
1a-2
LP

FIG. 8

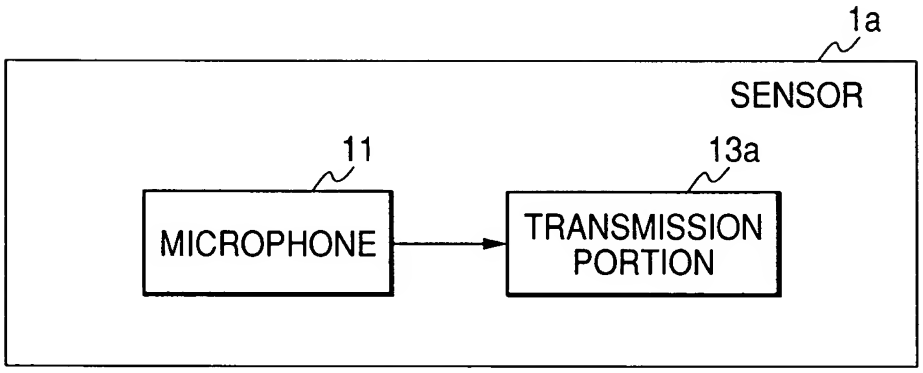


FIG. 9

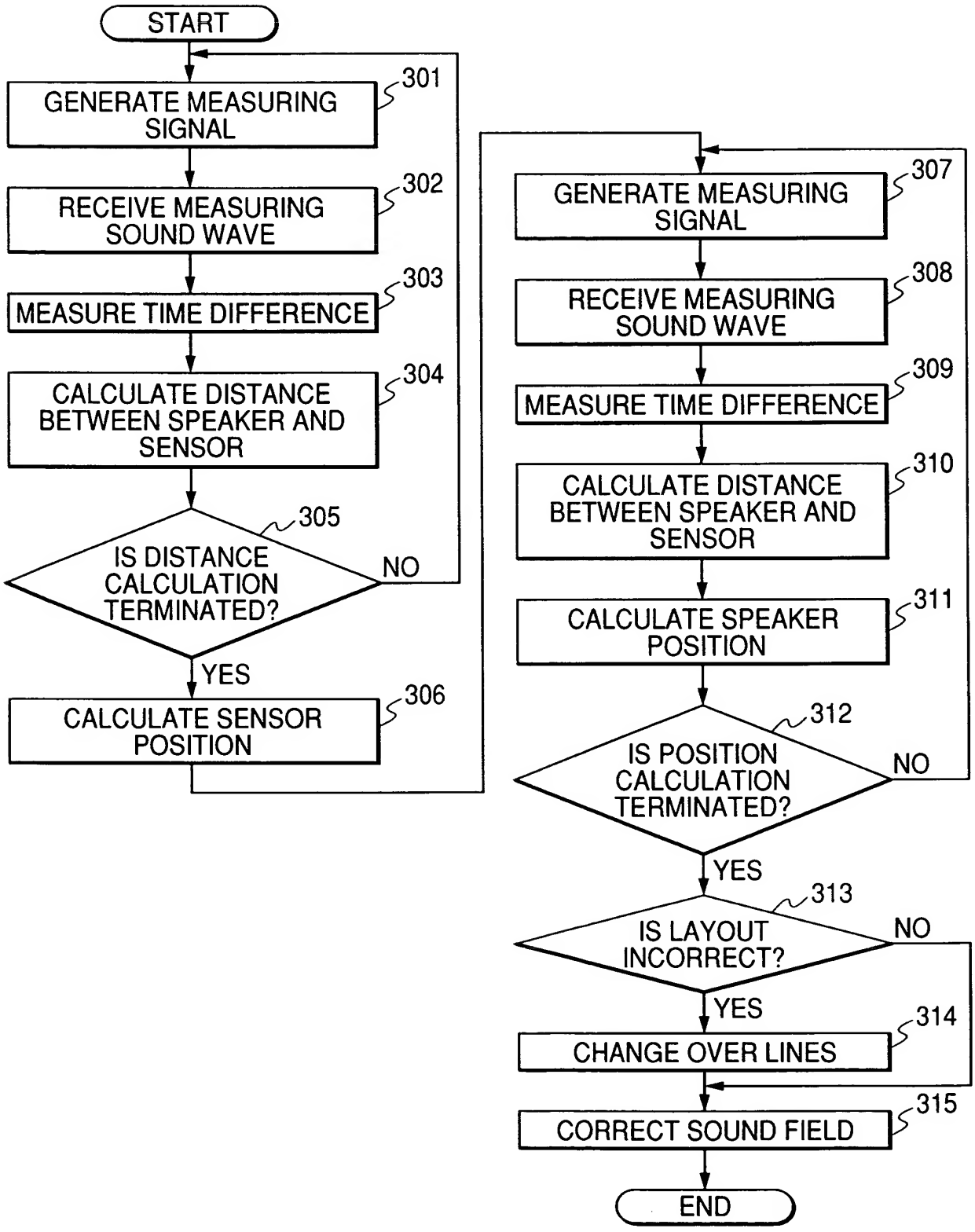

START
GENERATE MEASURING SIGNAL
301
RECEIVE MEASURING SOUND WAVE
302
MEASURE TIME DIFFERENCE
303
CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR
304
IS DISTANCE CALCULATION TERMINATED?
305
NO
YES
CALCULATE SENSOR POSITION
306
GENERATE MEASURING SIGNAL
307
RECEIVE MEASURING SOUND WAVE
308
MEASURE TIME DIFFERENCE
309
CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR
310
CALCULATE SPEAKER POSITION
311
IS POSITION CALCULATION TERMINATED?
312
NO
YES
IS LAYOUT INCORRECT?
313
NO
YES
CHANGE OVER LINES
314
CORRECT SOUND FIELD
315
END

FIG. 10

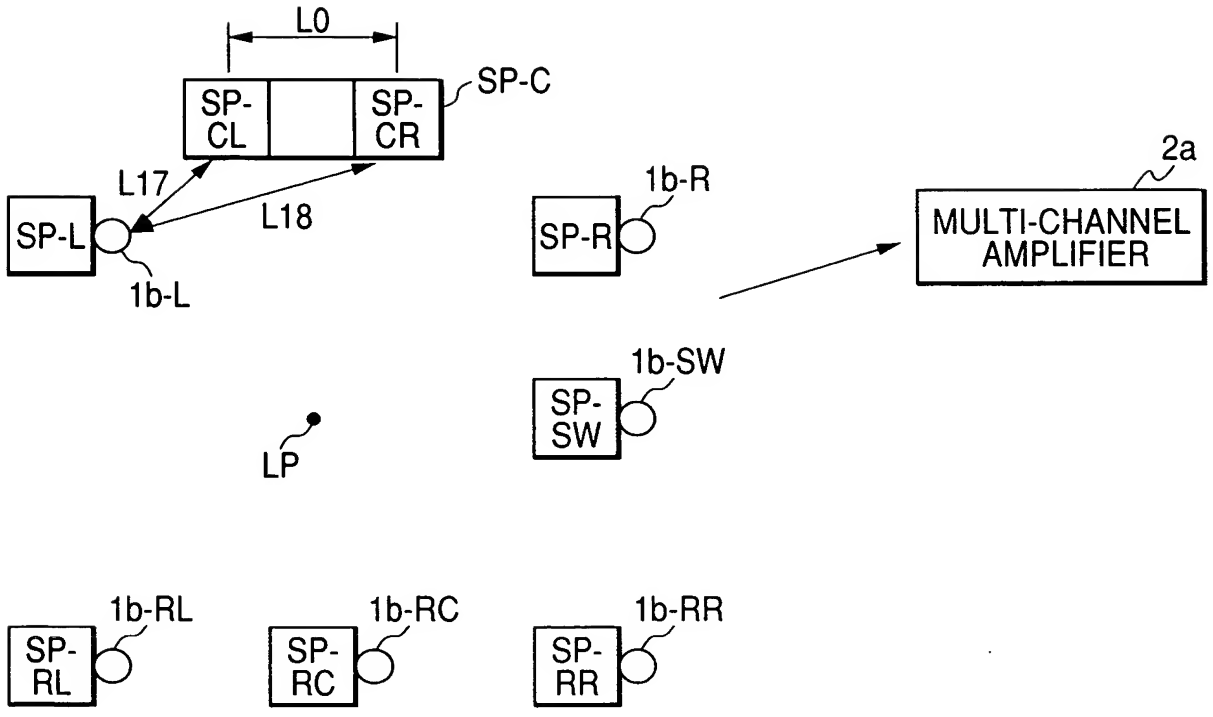
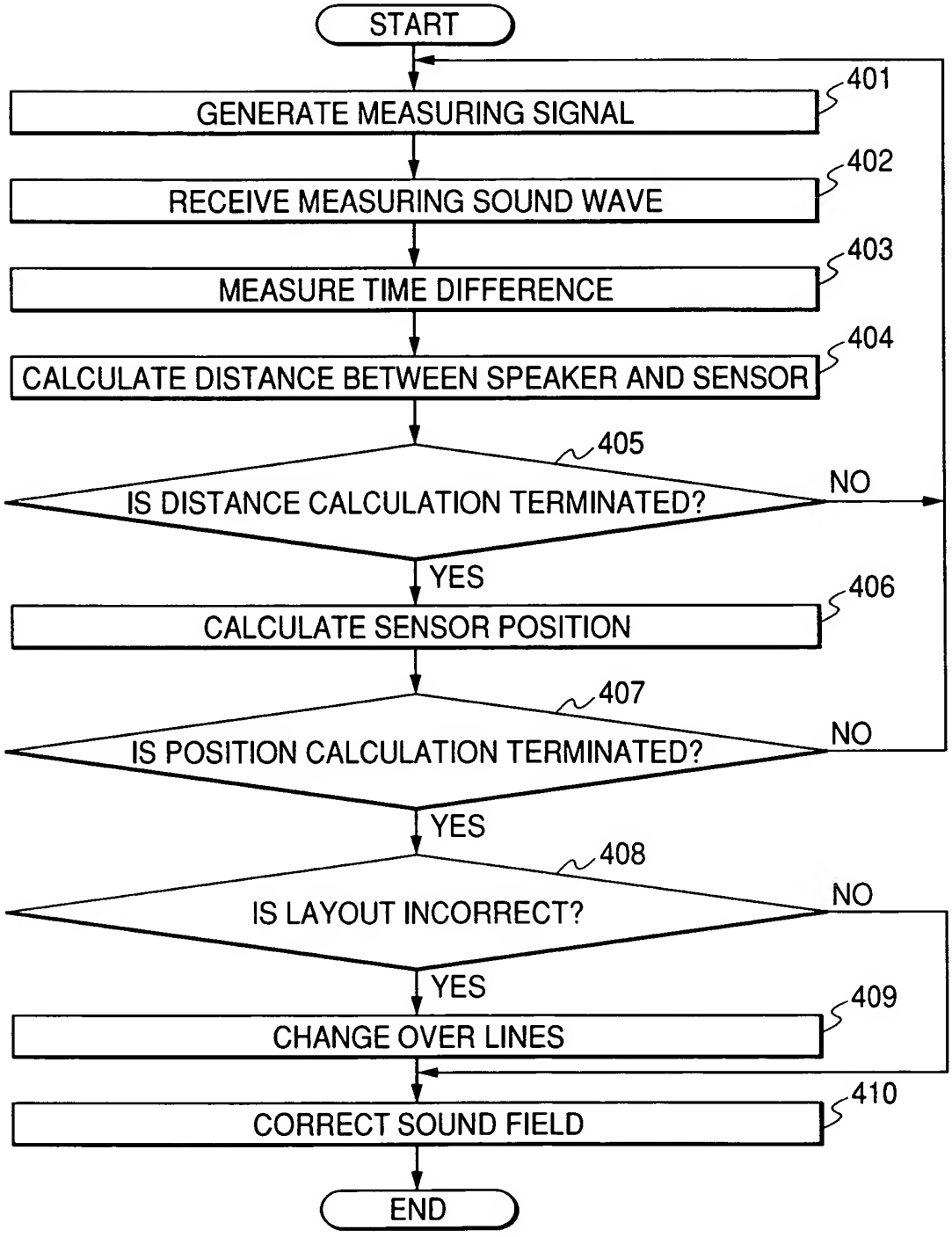

L0
SP-C
SP-CL
SP-CR
L17
L18
SP-L
1b-L
1b-R
SP-R
2a
MULTI-CHANNEL AMPLIFIER
1b-SW
SP-SW
LP
1b-RL
SP-RL
1b-RC
SP-RC
1b-RR
SP-RR

FIG. 11


START
GENERATE MEASURING SIGNAL
401
RECEIVE MEASURING SOUND WAVE
402
MEASURE TIME DIFFERENCE
403
CALCULATE DISTANCE BETWEEN SPEAKER AND SENSOR
404
405
IS DISTANCE CALCULATION TERMINATED?
NO
YES
CALCULATE SENSOR POSITION
406
407
IS POSITION CALCULATION TERMINATED?
NO
YES
408
IS LAYOUT INCORRECT?
NO
YES
CHANGE OVER LINES
409
CORRECT SOUND FIELD
410
END